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APPLICATION OF GALVANOSTATIC COULOMETRY FOR DETERMINATION OF PHENOLIC COMPOUNDS IN MEDICINAL PREPARATIONS

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Abstract. One of the promising methods for quantifying biologically active compounds is the galvanostatic coulometry method, characterized by simplicity of the experiment, expressiveness, high accuracy, lack of expensive equipment and use in a conventional control and analytical laboratory. The purpose of this work is to study the possibility of using reactions of electrogenerated titrants with phenolic compounds and to develop a method for their coulometric determination in drugs.

The objects of the study were: rutin - as a representative of the class of flavonoids and polyphenols; salicylic acid as a representative of phenolic acids and drugs containing phenolic compounds such as "Ascorutin", "Salicylic Paste" and "Salicylic Ointment". The titrants used were electrogenated halogens (Cl_2, Br_2 and I_2) and hexacyanoferrate (III) ions. Generation was carried out at a constant current strength of I = 10 mA, and the equivalence point was fixed biamperometrically with two polarized electrodes on the coulometric analyzer "Expert-006". The selected halogens are not only capable of oxidizing phenolic compounds, but also enter into electrophilic substitution reactions of the benzene ring, while the hexacyanoferrate(III)-ions $[Fe(CN)_6]^{3-}$ are mild oxidizing agents.

It has been experimentally proved that the electrogenated hexacyanoferrate-ion and iodine enter into reactions of a redox nature, but their potentials are low and oxidative ability is insufficient for the oxidation of salicylic acid. Salicylic acid is easily oxidized by chlorine, but this reaction proceeds non-stoichiometrically, therefore, for the quantitative determination of phenolic acids, electrogenated bromine was chosen as the optimal reagent.

It has been found that to determine the routine in real objects, electrogenerated Br_2 and I_2 can be used, and for ascorbic acid, any of the titrant studied. The correct definition was checked by the entered-found method, the error does not exceed 2%.

Prior to assays, the "Ascorutin" tablets were dissolved in suitable solvents, then the aqueous and alcoholic extracts were titrated with electrogenated bromine and iodine to determine the routine and ascorbic acid. As the experimental data showed, the developed coulometric titration technique with electrogenated bromine and iodine is characterized by good reproducibility of results, expression, accuracy and can be used to determine phenolic compounds in drugs, for example, "Ascorutin" tablets.

Thus, the culonometric method using electrogenerated titrants is recommended for the determination of salicylic, ascorbic acids and rutin in dosage forms. The method is accurate and, compared to the Pharmacopoeic method, eliminates the error of the experiment.